ELOG

web box data logger

User Manual

0	04/10/2013	2		4		6		**MS1-7533**
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I.   SAFETY

I.1   Preamble

You have just purchased an ELOG. Thank you for your choice.

To get the best from your device:

- Read the following operating instructions before installing and using the device.
- Follow the precautions for use stated in this document.

⚠	Meaning of symbol: Warning! Read the reference manual before using the device. In this reference manual, failure to comply with or carry out instructions preceded by this symbol can cause bodily harm or damage the equipment and installations.
ⓘ	Meaning of symbol: Information. The specific definition of the word preceding the symbol is provided in the glossary at the end of the document.

Make sure the device is intact and undamaged upon receipt. In the event of any problems, please contact the after-sales department for any repairs or replacements.

The device described in this manual is intended to be used by trained staff only.

Any maintenance operations must be carried out by qualified and authorized personnel only.

For correct and safe use and for all maintenance operations, it is essential that staff follow standard safety procedures.

This device is intended to be used in Category III installation and pollution degree 2 conditions in accordance with standard IEC 61010-1.

Before installation, check that the supply voltage matches that of the mains supply network.

I.2 Initial precautions

I.2.1 Safety precautions

Before any intervention, check that the device is unplugged from all power sources.

I.2.2 Precautions against electrical noise

Although the ELOG is protected from electrical and electromagnetically induced interference, keep away from the immediate vicinity of equipment generating significant electrical noise (high-power switches, busbars, etc.). The quality of data communication on the data bus depends heavily on taking such precautions.

I.2.3 Precautions in the event of downgraded operation

When safe operation is no longer possible, the instrument must be switched off and isolated. This applies when:
- The device is visibly damaged during operation (whether the device still operates or not),
- The device does not work after prolonged storage in poor conditions,
- The device no longer works following severe damage during transport.

I.2.4 Cleaning instructions

When the monitor is disconnected from the mains, clean the outer surface using only a dry cloth. Do not use abrasives or solvents. Prevent the connector terminals getting wet.

II. WARRANTY, RESPONSIBILITY AND INTELLECTUAL PROPERTY

II.1 Warranty

Unless expressly stipulated, the warranty runs for twelve months after the date of supply of the monitor (extract from our General Conditions of Sale, available on request).

II.2 Intellectual property rights

All manuals and documentation of any nature are the property of *ENERDIS* and protected by intellectual property rights, all rights reserved. They may not be distributed, reproduced, or translated, in whole or in part, in any manner and in any form whatsoever.

II.3 Copyright

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II.4 Registered trademarks

ELOG is a trademark registered by *ENERDIS*.

II.5 Equipment end-of-life

The products which we sell do not fall within the scope of Decree No. 2005-829 relating to the construction of electrical and electronic equipment and the disposal of waste arising from this equipment.

In accordance with Article L541-2 of the Environmental Code, it is the responsibility of the holder of the waste to dispose of it, or to make sure it is disposed of, appropriately.

PHYSICAL DESCRIPTION

III. OVERVIEW

III.1 Packaging

The equipment is delivered in compliance with your order. Each delivered product should contain, at least, the following parts:

Name	Quantity
ELOG Product	1
Quick installation guide	1

III.2 Optional accessories

Name	Comment	Code
Plate mounting kit	Allows fitting to the backplane of the cabinet	ACCT1007

III.3   Overview

ELOG is a centralization, collection, automatic logging and supervision unit for data from multi-function and multi-brand communications equipment (energy meters, power monitors, converters, sensors, probes, PLCs, etc.).

ELOG is equipped with a number of communications tools for data acquisition and use.

- **5 Digital Digitals** ⓘ in pulse mode:
  - for the reading of pulse output meter indices (water, gas, electricity, etc.).

- **1 Ethernet communications port** for several uses:
  - Modbus in master mode: real-time reading and periodic logging of the values of variables from multi-function and multi-brand equipment communicating via Modbus/TCP ⓘ, and Modbus over TCP/IP ⓘ protocols.
  - web server: configuration of the ELOG product and real-time consultation of the values of the variables of Modbus/TCP equipment, from embedded web pages;
  - Ethernet network: integration in an overall Ethernet network for multi-product and remote use of ELOG via HTTP protocol, using web services (supervision with E. Online, Remote logging and display by spreadsheet, etc.)

- **2 RS485 master digital communication ports:**
  - Modbus RTU master mode : real-time reading and periodic recording of the values of variables from multi-function and multi-brand equipment communicating via Modbus RTU protocol.
- 1 optical communications interface:
 - connectivity reserved for manufacturer maintenance.

ELOG is aimed both at the companies managing the monitoring and reduction of energy costs in an environmental and sustainable development context, and at industrial groups with complex multi-energy networks requiring precise management and monitoring.

All the information and data read and saved by ELOG can be used in several ways:

- **Embedded web pages**: for the configuration and initialization of ELOG and viewing the variables measured by Modbus and Modbus/TCP equipment.

- **Eonline2 software**: monitoring, analysis and surveillance software for energy performance which remotely carries out the periodic and automatic logging of the data saved and archived in the ELOG via the Ethernet network (Eonline2 is a software program published and distributed by ENERDIS).

- **Excel Spreadsheet**: provision of an Excel macro for the transfer and formatting of data in the form of tables and graphs. An input window enables the selection of equipment, variables and the period to analyze.

- **Third-party application**: the web services in JSON format available in ELOG enable the integration and use of information and data recorded on a number of applications (web browser, android, ios, etc.), in a wide variety of programming languages (Java, JavaScript, C, C++, Python, Labview, etc.).

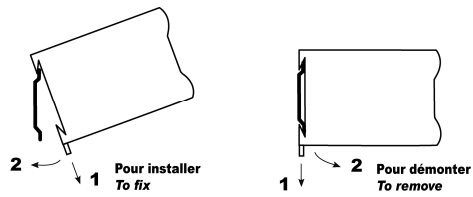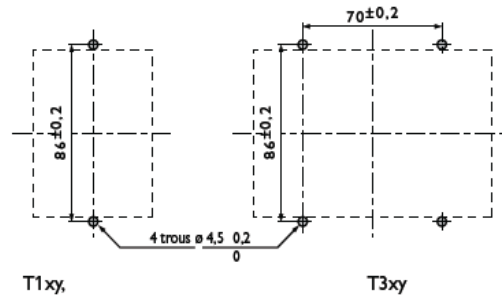ELOG is an energy monitoring architecture:
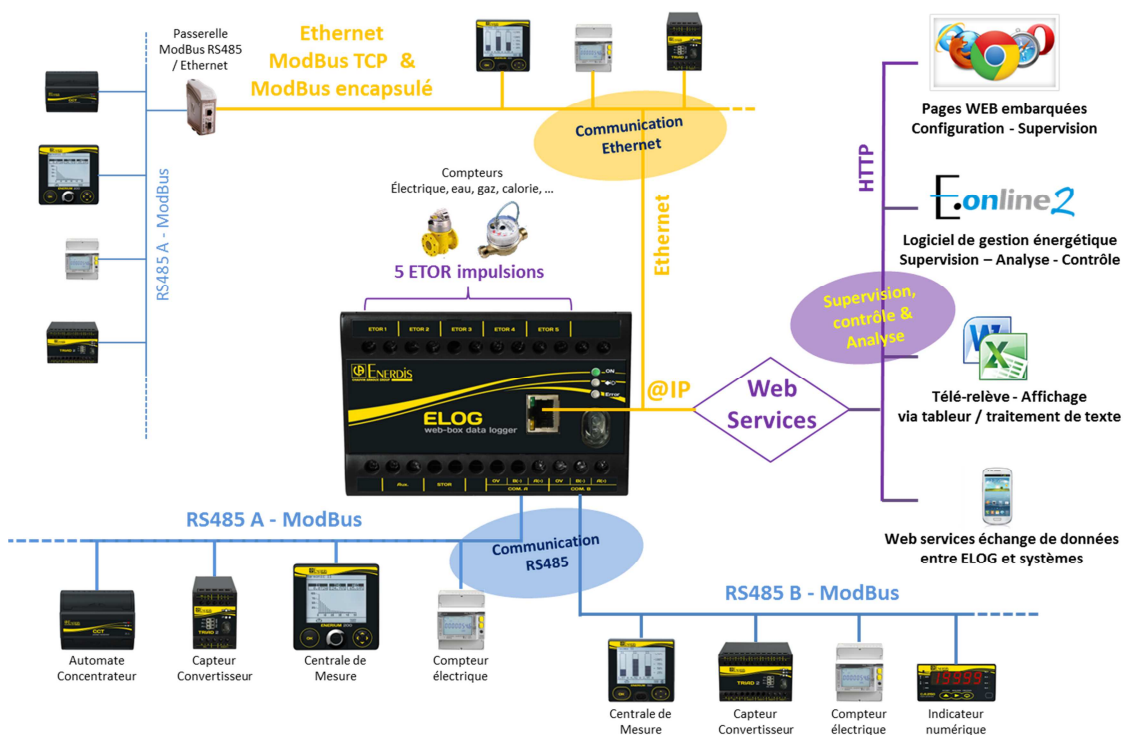
III.4   Fastening

ELOG is mounted on a DIN 35 mm rail, either in standard form or with screws thanks to the optional plate mounting kit (ACCT1007). The normal operating position of ELOG is the horizontal position.

Assembly on DIN rail   Drilling diagram for fastening with screws

ELOG dimensions: 120.5x120x81 mm (D x W x H)

IV. CONNECTION

This paragraph presents ELOG connections and terminal boards, specifies their connection and use and describes their electrical characteristics.

Prior remarks

Maximum applicable values

⚠️ It should be noted that exceeding the maximum applicable values can lead to a definitive deterioration of the device.

Cables and terminal boards

Connections are made on fixed-screw terminal boards for cables of a maximum section of 6mm² (multistrand) or 4 mm² (single-strand) for all circuits.

IV.1 Front panel

The front panel of the ELOG is as follows:

No.	Function	See §
1.	Auxiliary power supply	IV.2
2.	Status indicators	IV.3
3.	Ethernet Port (C)	IV.4
4.	RS485 Ports (A & B)	IV.5
5.	Digital inputs	IV.6
6.	Digital output	IV.7
7.	Optical interface port	IV.8

IV.2   Power supply for the ELOG

IV.2.1   Connection

The power supply circuit must be protected by fuses or a thermal magnetic circuit breaker.

ELOG's power supply is connected to the ports marked as Aux.

IV.2.2   Characteristics

Source	Characteristics
Alternating	80 Vac to 265 Vac. Frequency in the range of 42.5 Hz and 69 Hz on AC.
Direct	80 Vdc to 375 Vdc. Polarity-insensitive
Consumption	< 10 VA – 5 W.
Non-removable terminals	2 connection points. Screw terminals, with mobile cage. Connection of rigid or flexible wires of 4 to 6 mm^2. Maximum permitted torque on the terminal: 0.4 Nm.

Following a power cut, data is stored within the limits set out below.

Item	Characteristics
Information retention	10 years at 25℃ (drivers an d settings)
Date / time retention	30 days.
Power reserve	2.5 sec (under 230 Vac).

IV.3   Status indicators

Three status indicators (LEDs) provide information on the functioning of the ELOG.

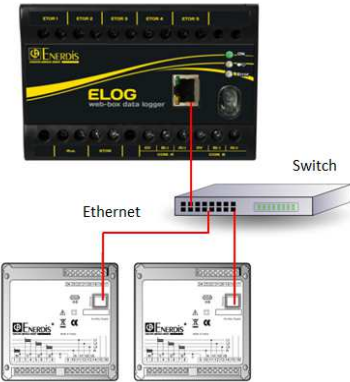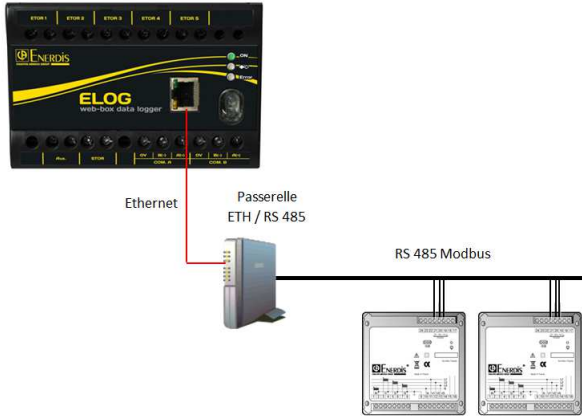|		
ON	Unlit	Product off
	Fixed green light	Product on
	Unlit	No communication
	Flashing green light	Communication on RS485 or optical ports in progress
Error	Unlit	No error
	Flashing red light	Product error

IV.4 The Ethernet port (Port C)

IV.4.1 Preamble

The Ethernet 10/100 Base T connector enables the ELOG to be connected to the Ethernet network, for several uses:

- o Modbus in master mode: real-time reading and periodic logging of the values of variables from multi-function and multi-brand equipment communicating via Modbus/TCP ⓘ and Modbus over TCP/IP ⓘprotocols.
- o web server: configuration of the ELOG product and real-time consultation of the values of the variables of Modbus/TCP equipment, from embedded web pages.
- o Ethernet network: integration in an overall Ethernet network for multi-product and remote use of ELOG via HTTP protocol, using web services (supervision with E. Online, Remote logging and display in spreadsheet, etc.)

IV.4.2 Connection

ELOG communicates with equipment according to two operating modes:

Remote equipment is directly connected to the Ethernet network → Connection through a switch or a hub.	Remote equipment is indirectly connected to the Ethernet network → Connection using an RS485 Modbus / Ethernet gateway.

Ethernet connector LEDs

| LED 1		LED 2		
Colour	**Meaning**	**Colour**	**Meaning**	
Unlit	No connection.	Unlit	No activity.	
Amber	Connection at 10 Mb per second.	Amber	Half duplex.	
Green	Connection at 100 Mb per second.	Green	Full duplex.	

IV.4.3 Ethernet port characteristics :

Item	Characteristics
Protocol	Modbus/TCP ℹ and Modbus over TCP/IP ℹ RTU mode in master mode HTTP in slave mode
Data logging frequency from network equipment	Analog type variable ℹ : every 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1200, 1800 or 3600 seconds Index type variable ℹ : every 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 or 60 minutes
Speed	10/100 Base T
Default address	192.168.0.2
Default mask	255.255.0.0
Maximum length	Transmission up to 100 m max.
Connection	8-pin RJ45 plug.

IV.5 The RS485 ports (Ports A and B)

IV.5.1 Preamble

ELOG is equipped with two RS485 (RS485 A and RS485 B) digital inputs using Modbus/Jbus protocol which operate in master mode. This enables ELOG to communicate with multi-function and multi-brand equipment connected to Modbus networks. ELOG displays the values of variables from equipment in real-time on its embedded web pages, and can periodically save them to memory.
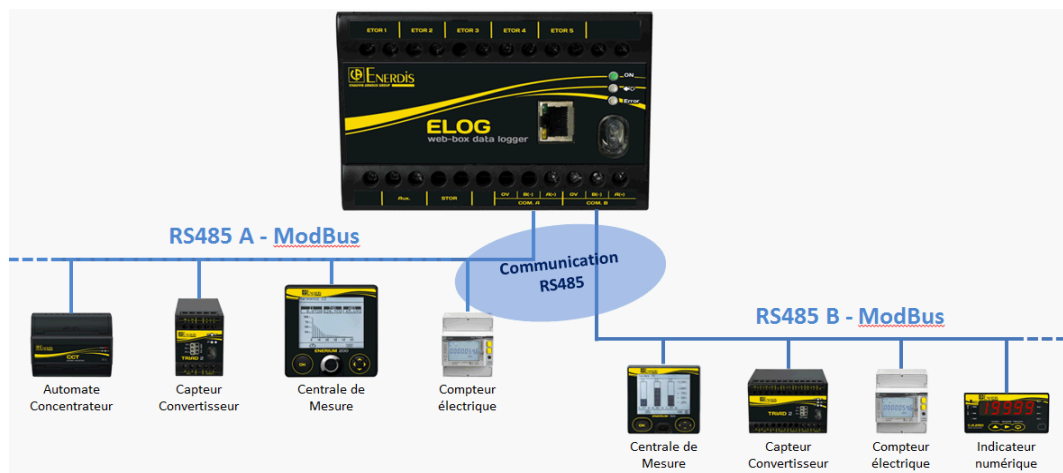
IV.5.2 Layout

The RS485 communications ports are marked as COM A and COM B on the front panel.

The ELOG runs in master mode for these two ports, RS485 A and B.

IV.5.3 Connection principle

Only tests on the real network can confirm the best combination (speed, network length, impedance matching, etc.).

IV.5.4 Technical reminders and precautions for the 2-wire RS485 network

Type of cable to use:

Screened twisted-pair cable with a section of more than 0.2 mm^2 (UL2493 or UL2919 type with multiple screening for very noisy areas). The continuity of screening along the communications network must be ensued, and the screening must be connected to the 0 V of the RS485 output on a single piece of equipment of the RS485 MODBUS/JBUS network, generally at the start or end of line.

Installation of the RS485 cable:

The multi-pair cable must not be severed. Make a cut in the protective sheath and remove a pair (the continuity of screening along the communications network is therefore ensured). If the cable has to be cut, re-establish the continuity of screening by connecting the screening of the two ends of both cables.

RS485 network structure:

If the routing of the RS485 network forces the network to be split into two or more distinct branches, the route node must be equipped with an RS485 line amplifier or an nxRS485 line repeater HUB.
The maximum characteristics of an RS485 network are:
- o maximum length: 1.2 km,
- o Maximum 31 pieces of equipment connected to an RS485 segment.

The RS485 network can be extended to more than 1.2 km and 31 pieces of equipment through the use of Modbus RS485 hubs / amplifiers.

Layout example:
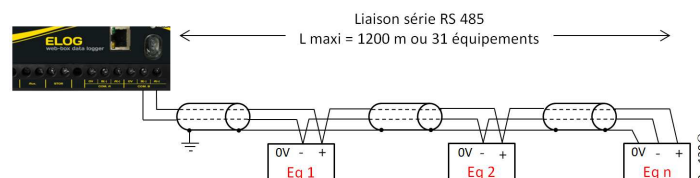
IV.5.5 Connection in a clean environment

For a RS485 network in a clean electrical environment, use a twisted-pair cable. This cable should be connected to terminals A(+) and B(-). The convention adopted for terminals A and B corresponds to EIA 485, specifying logic level "1" on the line corresponds to VB> VA and a logic level "0" corresponds to VA> VB.

ELOG
COM. B

| 0V | B(-) | A(+) |

RS485 (A+)

RS485 B(-)
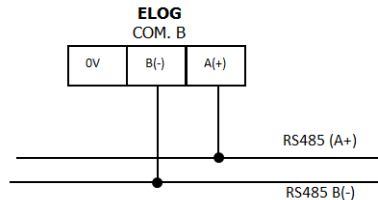
IV.5.6 Connection in a noisy environment

■ **With screening:**

In the case of particularly noisy electrical environment, a screened twisted pair should be used, and the screening should be connected to the 0 V terminal of the ELOG.

ELOG
COM. B

| 0V | B(-) | A(+) |

RS485 A(+)

RS485 B(-)
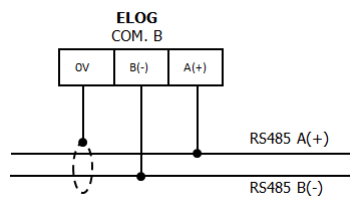
■ **With screening and resistors (polarization and load)**

To improve the quality of transmission in noisy environments, it is possible to polarize the line at a single point. This polarization sets the resting level, in the absence of transmission, by two 1.2 kΩ resistors between the 0 V and 5 V lines. It is sometimes necessary to connect the two ends of the bus via a 120 k Ω resistor.

ELOG
COM. B

| 0V | B(-) | A(+) |

0V

Rp 1,2 kΩ

Esclave 1 Modbus

Rc 120 Ω

RS485 A(+)

RS485 B(-)

Rp 1,2 kΩ

Esclave 2 Modbus

+5V
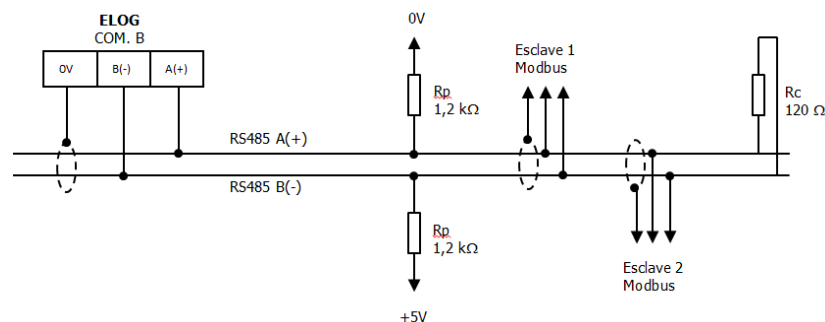
### IV.5.7 RS485 port characteristics

Item	Characteristics
Protocol	Modbus RTU ⓘ.
Operating mode	Half duplex Master mode
Data logging frequency from network equipment	Analog type variable ⓘ : every 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1200, 1800 or 3600 seconds Index type variable ⓘ: every 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 or 60 minutes
Speed	24,00, 4,800, 9,600, 19,200 and 115,200 Bauds.
Parity	no, even or odd.
Number of stop bits	1 or 2
Connection	Screened 2-wire, half duplex
Non-removable terminals	3 connection points. Screw terminals. Connection of rigid or flexible wires between 4 and 6 mm^2. Maximum permitted torque on the terminal: 0.4 Nm.

- Communication is in half duplex mode.. The functions implemented are:
    - Function 03   : Read N words
    - Function 04   : Read N words
    - Function 16   : Write N words (not available)

IV.6   Digital inputs

IV.6.1   Preamble

ELOG has five independent digital inputs. They are marked ETOR1 to ETOR5. They work in pulse mode : to each of them the user can connect any type of equipment working on this principle (water, gas or electricity meter, sensor, etc.), complying with the following characteristics:
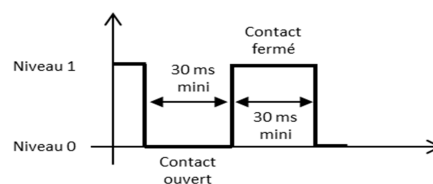

The received pulses are multiplied by the weightings of the pulses on this input and are then summed in an Index type variableⓘ. The pulse weighting can be configured with a relation of 1/10000th, and each periodic reading of the index can be archived in the ELOG. The index start value can be set to that displayed on the connected meter.

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IV.6.2   Digital input connection.

The electrical connection of digital inputs to ELOG requires the presence of an external Vdc power source.

- Connect the input signal as follows:
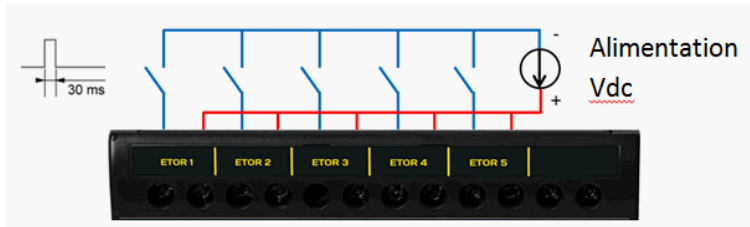
Example of the connection of digital inputs in pulse mode.

The terminals are polarity-insensitive.

IV.6.3   Electrical characteristics of digital inputs:

Item	Characteristics
Number of inputs	5.
Operating mode	Counting
Input signal	Direct.
Logic levels	Level "0": Amplitude < 5 Vdc Level "1": Amplitude > 7 Vdc and < 72 Vdc Minimum duration of pulse at level "0": 30 ms Minimum duration of pulse at level "1": 30 ms
Frequency of pulses	0 to 16.67 Hz
Power absorbed	< 0.5 W per digital input.
Isolation between inputs	2.2 kV – 1 min.
Type of protection	Optocoupler.
Logging frequency of the index values of digital inputs	Every 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 or 60 minutes

IV.7   Digital output

Not available on this model.

IV.8   Optical interface port

This optical interface is exclusively reserved for manufacturer maintenance.

V. DATA LOGGING MODE

ELOG can periodically record the values of variables from equipment connected to:

- Digital Digitals ⓘ: logging of Index type variables ⓘ
- RS485 A and RS485 B in Modbus RTU ⓘ: logging of Index and Analog type variables ⓘ.
- The Ethernet connector in Modbus/TCP ⓘ and Modbus over TCP/IP ⓘ: logging of Index and Analog type variables.

Value logging frequency can be adjusted for each type of variable, from the following values:

- analog type variable: every 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1200, 1800 or 3600 seconds.
- index type variable : every 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 or 60 minutes.

V.1 ELOG memory operating mode

The memory depth is of:

- 3 months (month in progress, month-1, month-2) of data for logging frequencies of over 1 minute.
- 3 days (day in progress, day-1, day-2) of data for logging frequencies of less than 1 minute,

Warning: memory depth available to download is counted from the product's current date and time. Data below 1 minute will no longer be available for download if an ELOG is left unplugged for more than 3 days. Data over 1 minute will no longer be available for download if an ELOG is left unplugged for more than 3 months.

VI. TECHNICAL AND FUNCTIONAL LIMITS OF THE ELOG

Driver: ⓘ
- Max number of drivers: 100,
- Max number of configurable Simple variables ⓘ per driver: 30,
- Max number of configurable Composite variables ⓘ per driver: 10**.**

Device: ⓘ \h
- Max number of configurable devices: 100.

Type of variables recorded :
- Index type variable ⓘ
- Analog type variable ⓘ

Logging frequency : ⓘ
- Analog type variable: every 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1,200, 1,800 or 3,600 seconds:
- Index type variable : every 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 or 60 minutes
- Adjustable independent frequency for each device.

Logging capacity:
- Max number of periodically logged variables: 50,
- 3 months (month in progress, month-1, month-2) of data for logging frequencies of over 1 minute,
- 3 days (day in progress, day-1, day-2) of data for logging frequencies of less than 1 minute,
- Memory operating mode: FIFO ⓘ (First In First Out).
- 8 GB storage capacity.

EMBEDDED WEB PAGES

VII.   QUICK PRESENTATION

The general web interface of ELOG looks as follows:
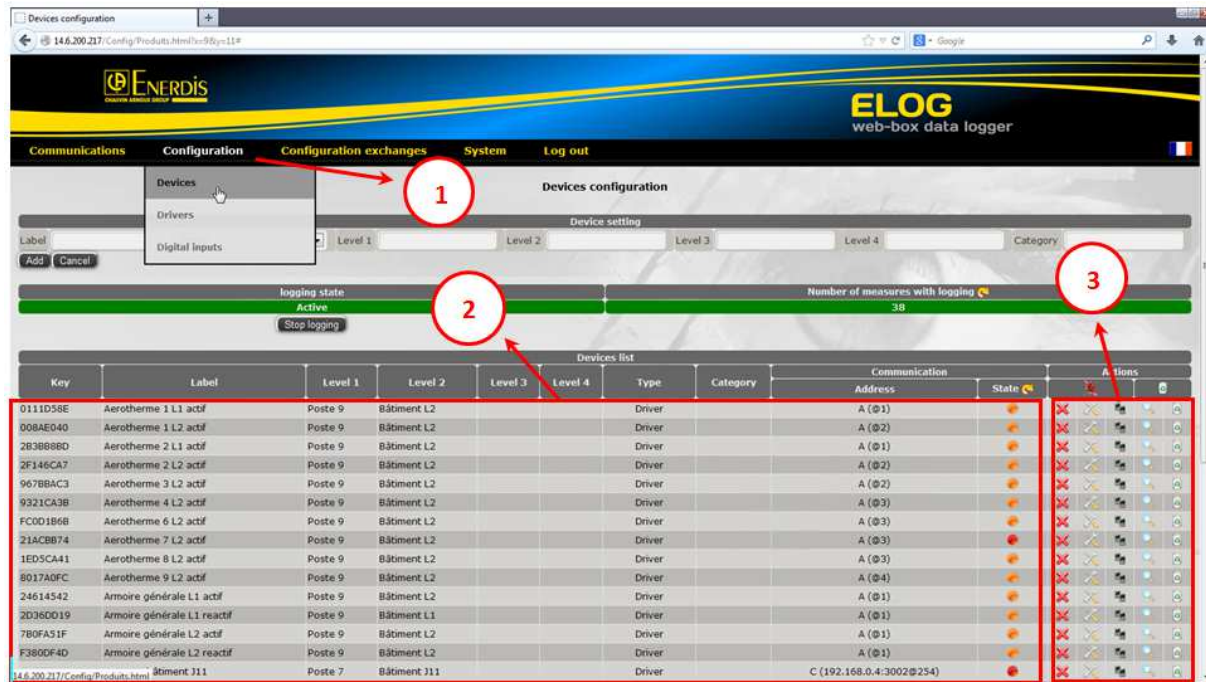
It is made up of three main areas:
- ① A scrolling menu bar enables you to browse through ELOG's various embedded web pages.
- ② A list of all the Devices ❶ configured on the ELOG.
- ③ An actions area, containing all the actions which can be performed on the device in question.

Browsing within an ELOG can be done through the upper menu of the page. You can only access all the features of your ELOG through its web pages.

The flag icon enables the menu display language to be selected: French / English.

   Notes
- <@IP_ELOG> is used to specify the IP address of the configured ELOG.
- http:// <@IP_ELOG> is used to specify the URL of embedded pages of the ELOG.

VIII. CONNECTION TO AN ELOG

This paragraph explains how to connect to an ELOG from an internet browser

Pre-requisites

You have an internet browser and access to a network the ELOG is connected to.

Operating Mode

The default IP address of your ELOG is 192.168.0.2 (mask: 255.255.0.0).

For connection to the default IP address of your ELOG :

- Configure the network card of your computer to connect to the same subnet as ELOG (for example, configure IP address 192.168.0.3 / 255.255.0.0).
- Open your internet browser and enter the following HTTP address in the URL bar: http://192.168.0.2
- Enter Login: "enerdis".
- Enter the password: "!elog2013!".
- Click on the ⊙ icon to validate.

IX. LOG OUT FROM AN ELOG

This paragraph explains how to log out from an ELOG from an internet browser

Pre-requisites

You are connected to one of the pages of an ELOG (apart from the authentication page).

Operating Mode

- Click on the "Log out" to return to the authentication page.
- Close your internet browser.

X.   CONFIGURATION OF THE ETHERNET PORT

This paragraph explains ELOG Ethernet network configuration (port C)

Pre-requisites

Your computer is connected to your ELOG with a crossover cable and you have logged in.

Operating Mode

- Click on "System > Ethernet Port".
- You have to fill in:
    - The host name of your ELOG on the network.
    - The length of the Timeout ❶: (by default 500 ms).
    - The type of assignment of the IP address of your ELOG.
        - Select "Static" if you want to configure the IP address and network mask of your ELOG. Beware, if you change your network, ELOG will no longer be visible from your computer and you will need to reconfigure your own network settings. (Recommended).
        - Select "DHCP" (Dynamic Host Configuration Protocol) if your ELOG is connected to a network with a DHCP server. An address IP is then automatically assigned to your ELOG by the DHCP server of the network.
    - The new IP address,
    - The value of the subnet mask.

- Fill in the optional fields:
    - SMTP (mail server), NTP (synchronization of date and time), Gateway and DNS.

- Click on "Modify" for the new settings to be taken into account. The message **"Ethernet port modified successfully"** confirms that the operation has been successfully completed. Click "Cancel" to exit the section without making any changes.

XI. DATE AND TIME CONFIGURATION

> **This paragraph explains how to configure the date and time on an ELOG**

Pre-requisites

Your ELOG is accessible and you are connected to its embedded web pages.

Operating Mode

- Go to "System > Date".
- Select your time zone from the drop-down list.
- Click on "Synchronize with the desktop" to transfer the new date/time to ELOG.
- Click on "OK" for the **'synchronization complete'** message to validate the synchronization of the time and date between your desktop and the ELOG.

  The ELOG's time and date can be synchronized to an NTP (Network Time Protocol) server (see "Configuration of the Ethernet port" paragraph).

XII.   IMPORT A CONFIGURATION INTO ELOG

This paragraph explains how to import a list of Devices and/or Drivers into ELOG from an existing configuration file

Pre-requisites

Your ELOG is accessible and you are connected to its embedded web pages.
You know the location of the configuration file to import (xxxx.tar.gz type file).

Operating Mode

- Go to "Configuration exchanges > Configuration import".

Two options are available:

Import the entire configuration :
- o The entire list of Devices 🛈 and associated Drivers 🛈 contained in the file xxxx.tar.gz are imported into the ELOG.
- o **Note:** The network configuration is not modified.
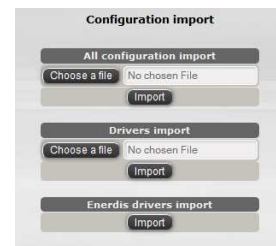
Driver import :
- o If the driver is already in the list contained in the file xxxx.tar.gz in the ELOG, it is updated.

Driver bookshop interns import :
- o The whole list of Drivers contained in the bookshop of ELOG is downloaded in the ELOG.

Important :

Every Test point (PdM), Driver or Variables contained in a Driver are identified by a unique key. The import of a list of PdM and/or Drivers (via the commands" Import the entire configuration " - " Driver Import" - " Driver bookshop interns import") entraine for all the elements (PdM, Driver or Variable) with an identical key :

- *The replacement of this element by that imported*
- *All the elements possessing a not pre-existent key in ELOG are added*

The modification of an element (PdM, Driver or Variable) in ELOG entraine not no modification of its key. Only the addition of an element (PdM, Driver or Variable) entraine the creation of a new key

Import the entire configuration :

- Click on "Choose a file" and select the file to import (e.g.: **config.tar.gz**) in the tree structure of your computer, then click on "Open".
- Then click on "Import". The "Configuration updated" message confirms that the import has been successfully completed.

Driver import :

- Click on "Choose a file" and select the file to import (e.g.: **config.tar.gz**) in the tree structure of your computer, then click on "Open".
- Then click on "Import". The "Configuration updated" message confirms that the import has been successfully completed.

Driver bookshop interns import :

- Then click on "Import". The "Configuration updated" message confirms that the import has been successfully completed.

Check the import by clicking on "Configuration > Devices" for a configuration import, or "Configuration > Drivers" for a driver import.

XIII.   EXPORT A CONFIGURATION FROM THE ELOG

This paragraph explains how to export a list of Devices and/or Drivers from the ELOG

Pre-requisites

Your ELOG is accessible and you are connected to its embedded web pages.

Operating Mode

- Click on "Configuration exchanges > Configuration export".
  Two options are available:
  <u>Export the entire configuration:</u>
  o   The entire list of Devices ❶ and associated Drivers ❶ are saved in a file.
  <u>Driver export:</u>
  o   Only the list of drivers is saved in a file.

- Click on "Export".
- Check "Save file", then validate with "OK".

  The file (**config.tar.gz**) is then saved into the folder which you have defined in Windows to store your downloads (by default: My Documents / Downloads).
  You can then rename your file, maintaining the initial syntax.
  E.g.: **config** ELOG1 192-168-0-11**.tar.gz.**

XIV.   CONFIGURATION OF PORTS RS485 A AND RS485 B

> **This paragraph explains how to configure the ELOG's RS485 ports**

Pre-requisites

Your ELOG is accessible and you are connected to its embedded web pages.

Operating Mode

- Click on "Communications > Ports RS485 A and B".

- Select the communication port to configure (Port A or Port B).

- In the "RS485 communication settings", you must fill in the following fields:
    - Speed (bauds - Default setting: 9600),
    - Stop bits (bits - Default setting: 1),
    - Parity (Default setting: No parity),
    - Timeout ⓘ: (ms – Default setting: 500),
    - Delay between 2 requests ⓘ: (ms – Default setting: 50).

- Click on "Modify" to save the settings or "Cancel" to exit the section without making any changes.

XV.   CONFIGURATION OF DIGITAL INPUTS

This paragraph explains how to configure the ELOG's digital inputs (pulse mode)

Pre-requisites

Your ELOG is accessible and you are connected to its embedded web pages.

Operating Mode

- Go to "Configuration > Digital Digitals ❶".
- Click on the ⚒ icon in the digital input line (1 to 5) to configure.
- Fill in:
    - A "Label" for your digital input.
    - The digital input mode ("Counting" mode as default).
    - The Index type variable ❶ measurement "unit" of the meter.
    - Either enable or disable the possibility of creating periodic Indexes ❶ of the number of pulses generated by the meter of this digital input. Logs are validated upon creation of a Device.
    - The "Pulse weight" of the pulse output of the meter which you want to assign to the digital input (x 1/10000th - Default value: 10000).

        E.g.: meter output pulse weight 2.5 kWh/pulse,

        → Value to fill in 2.5 x 10,000 = **25,000.**
    - Possibly the initial value of the index, if your meter displayed a non-zero value before connection to the ELOG's digital input.

        E.g.: value displayed on the meter of 256982.52 kWh,

        → Value to fill in 256,982.52 x 10,000 = **2,569,825,200.**

- Click on "Validate" to save the digital input settings or "Cancel" to exit the section without making any changes.

XVI.   CREATION OF A MODBUS DRIVER

> This paragraph explains the procedure to follow to create a Modbus Driver ❶ associated with a type of device connected to the RS485 or Ethernet inputs.
> A Driver comprises variable ❶ and/or variable Modbus variables ❶.

Pre-requisites
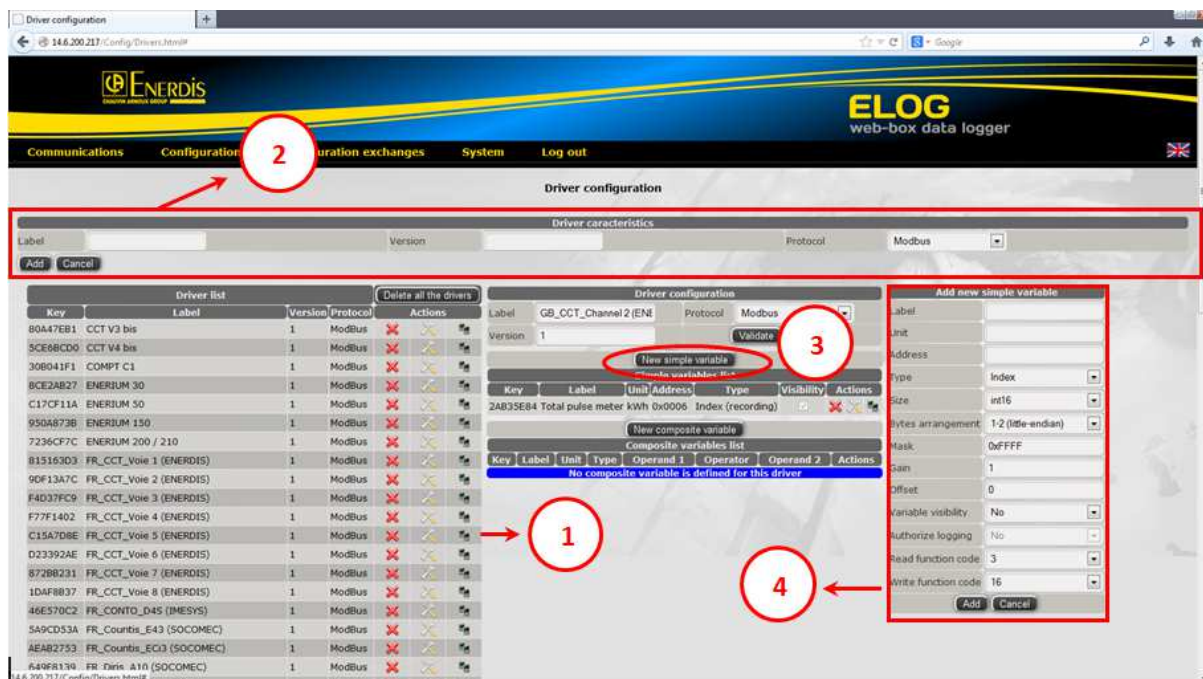
Your ELOG is accessible and you are connected to its embedded web pages.
You know the brand and model of the device to be used.
You have a memory map and the table of measurements for the equipment to be used.

Operating Mode to Create a Driver

- Go to "Configuration > Drivers".

  ① On the left of the page the list of drivers already created is visible. If the driver which you want to use is not on this list you must create it. The following procedure should be followed:

- ② Fill in:
  - o A "Label" for your driver.
  - o A "Version" reference for the driver.
  - o Protocol: Modbus RTU ❶ (default value).

- Click on "Add" to create the driver.

The created driver is highlighted in blue in the table of drivers.

- You can:
  - "Delete" a driver by clicking on the ✖ icon,
  - "Modify" a driver by clicking on the ⚒ icon,
  - "Copy" a driver by clicking on the 🖼 icon.

IMPORTANT: It is not possible to delete a driver if it is associated with a Device ⓘ.

Operating Mode to Create a Simple variable

- Locate your driver in the list of drivers.
- Then click on the 🔧 icon to add variables to the driver.
- ③ Click on "New Simple variable" ❶.
- ④ Fill in:
  - The variable's "Label".
  - The "Unit" of the simple variable.
  - The "Address" in the mapping to read the variable.
  - The "Type" of variable:
    - <u>Index type variable</u>❶: if it is a variable to measure an accumulated value over time (index of an energy meter, quantity of product units manufactured, etc.).
    - <u>Analog type variable</u>❶: if it is a simple measurement variable (instant value, average, etc.).
  - The "Size" of the variable:
    - uint: full value without sign,
    - int: full value with sign,
    - float: actual value,

    Followed by the number of bits of which this variable is made up (16, 32 or 64).

    E.g.: uint 32: Full value without sign encoded on 32 bits.

  - The "Bytes arrangement" which corresponds to the read order of the bytes of the variable:
    - 2-1-4-3,
    - 4-3-2-1 (big endian): High Byte at the lowest address,
    - 1-2-3-4 (little endian): Low Byte at the lowest address,
    - 3-4-1-2.
  - The "Mask" enables just part of the variable to be used (e.g.: the mask to use for the 8 first bits of a 32 bit big endian is 00000000-00000000-00000000-11111111 in binary so 000000 FF in hexadecimal).

    <u>Example</u>:
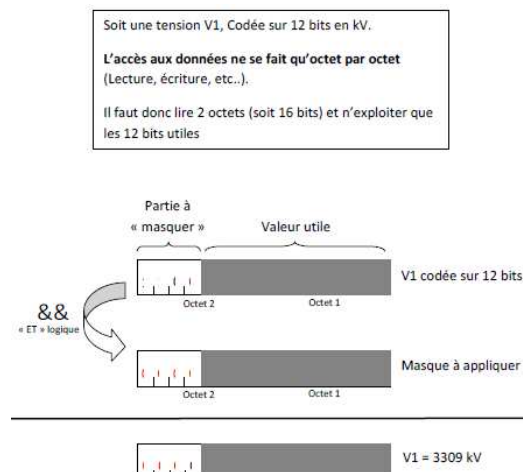
- o The "Gain": multiplying factor to apply to the variable (Default value: 1).
- o The "Offset" to add to the value of the variable (Default value: 0).
- o "Variable visibility" : select "Yes" in the "Variable visibility" box if the variable needs to be displayed on the web pages of the ELOG.
- o Either enable or disable the possibility of creating periodic Indexes ❶ of the value of the variable. Logs are validated upon creation of a Device.
- o The "read function code": JBUS function enabling the reading of n words. (3 or 4, Default value: 3).
- o The "write function code": JBUS function enabling the writing of n words. (16)
- ■ Click on "Add" to save the newly filled-in variable.
- ■ ③ Then use the "New simple variable" command to add to the list of simple variables.
- ■ From the list of simple variables you can:
  - o "Delete" a simple variable by clicking on the ✖ icon,
  - o "Modify" a simple variable by clicking on the ⚒,
  - o "Copy" a simple variable by clicking on the 🖳,

Operating Mode to create a Composite variable

- Click on "New Composite variable" (this section enables variables to be created from the combination of simple variables defined in the "New simple variable" stage).

- Fill in the "New Composite variable" ❶ section:
  - o The "Label" for the composite variable to create,
  - o The "Unit of the composite variable.
  - o The "Type" of variable:
    - ▪ <u>Index type variable</u>: if it is a variable to measure an accumulated value over time (index of an energy meter, quantity of product units manufactured, etc.).
    - ▪ <u>Analog type variable</u> ❶: if it is a simple measurement variable (instant value, average, etc.).
  - o "Operand 1": select from the list of available simple variables.
  - o Select an "Operation" (+, -, x, /).
  - o "Operand 2": select from the list of available simple variables.
  - o Either enable or disable the possibility of creating periodic Indexes ❶ of the value of the variable. Logs are validated upon creation of a Device.

- Click on "Add" to save the newly filled-in variable.

- Then use the "New composite variable" command to add to the list of composite variables.

- From the list of composite variables you can:
  - o "Delete" a composite variable by clicking on the ✖ icon,
  - o "Modify" a composite variable by clicking on the ⚒ icon,
  - o "Copy" a composite variable by clicking on the ▦ icon.

XVII.   ADD A DEVICE / ACTIVATE LOGGING

> **This paragraph explains the procedure to follow to create a Device which will be associated to a driver or digital input.**

Pre-requisites

You have already thought out the geographic or functional organization of the various Devices ❶ for your installation. (Level 1, 2, 3, 4 and category).

Your ELOG is accessible and you are connected to its embedded web pages.

The Driver ❶ for the device exists and/or the Digital input ❶ is configured.

Operating Mode

- Click on "Configuration > Devices".
- The following window is displayed:

- ① Fill in:
    o A "Label" for your Device
    o The "Type": "Driver" or "Digital Input"
        ▪ Driver:
            - Choose the "driver label" from the scroll-down list.
            - Either enable or disable "Index logs ❶". If you choose "Active", the chronological logging of all values of the index type variable of the device is activated.

- Define the "Index Logging frequency ❶" (possible values are: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 minutes).
- Either enable or disable "Analog measurement logs ❶". If you choose "Active", the chronological logging of all values of the analog type variable of the device is activated.
- Define the "Logging frequency of analog measurements" (possible values are: 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1200, 1800 or 3600 seconds).
- Choose the communications port which the "RS485 port A or RS485 port B or Ethernet Port" equipment is connected to.
    o RS485 port A or RS485 port B : Fill in the protocol (Modbus RTU ❶ as default) and the Modbus slave address ❶ of the Device equipment.
    o Ethernet Port: choose Modbus/TCP ❶ or Modbus over TCP/IP ❶
        ▪ Modbus/TCP: fill in the IP address of the Device equipment, the port number (502 as default) and the slave address of the Device equipment (1 as default).
        ▪ Modbus over TCP/IP: fill in the IP address of the gateway, the port number (502 as default) and the Modbus address of the Device (1 as default).
        ▪

▪ Digital Input :
    - Select the "digital input number" (1 to 5) which the Device equipment has been connected to.
    - Either enable or disable "Index logs ❶". If you choose "Active", the chronological logging of all values of the index type variable of the digital input is activated.
    - Define the "Index Logging frequency ❶" (possible values are: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 minutes).
    -

o Fill in the Device "Level" and "Category" fields (Optional).

▪ Click on "Add" to save the Device.
The created Device is highlighted in blue in the Device table.

- ② Refresh your browser display to show Device labels in alphabetical order.

- ③ From the list of Devices, you can:
    - o "Delete" a Device by clicking on the ✖ icon,
    - o "Modify" a Device by clicking on the ⚒ icon,
    - o "Copy" a Device by clicking on the ▦ icon.

XVIII. VISUALIZE THE MEASUREMENTS OF A DEVICE IN REAL-TIME

> **This paragraph explains how to view the measurements read in real-time by Device equipment.**

Pre-requisites

- Your ELOG is accessible and you are connected to its embedded web pages.
- Equipment must be operational.
- A Device ❶ needs to have been created.

Operating Mode

- Click on "Configuration > Devices".
- The following window is displayed:

In area ④,
- o Check that the logging state is active
- o Click on the "Restart logging" button if required.
- o Click on the "refresh" icon 🔄 to update the "Number of measures with logging".

The colour code used for the strip is:

logging state	Number of measures with logging
Active	38
Stop logging	

Green: Logging is active.
Red: logging is off.

Green: The number of measures with active logging is comprised between 1 and 44 inclusive
Amber: The number of measures with active logging is comprised between 45 and 50 inclusive
Red: The number of measures with active logging is higher than 50

In area ②,
  o Check the addresses of Devices:

ETOR (1 to 5)	The Device ❶ is connected to one of the five Digital Digitals ❶ .
A (@i)	The Device is connected to the Modbus network to port A and its address is i.
B (@j)	The Device is connected to the Modbus network to port B and its address is j.
C (IP :k @k)	The Device is connected to the Ethernet network to port C. The following are displayed in the brackets, in this order: the IP address of the Device, the relevant port number and the Modbus address of the Device on the port.

  o Click on the "refresh" icon 🔄 to update the communication status.
    Three situations can then arise:

🟢	Successful communication with the equipment.
🟠	Status not determined by ELOG.
🔴	Unsuccessful communication with the equipment.

- In area ③, click on the 🔍 icon.
  This action enables a pop-up window to open, to see the measurements associated with the driver (or the digital input) of the Device.

Measurements for device Enerium_300_EN			
Device :Enerium_300_EN 🐾			
Simple variables			
Key	**Label**	**Unit**	**Instant values**
1E4F82A7	Active Energy +	kWh	5119
44AD2F3D	Active Power +	kW	1.265
BE7160AA	Apparent Power	kVA	1.304
50E1821B	Current I1	A	2.6373
FB1484EA	Current I2	A	2.6369
DC30349B	Current I3	A	2.6366
86BA6E1F	Current In	A	0
E94082E3	Frequency	Hz	50.12
891D175D	Power Factor	-	0.9705
E0A99C14	Reactive Energy Q1	kWh	0
E0312F73	Reactive Energy Q4	kWh	1641
270F0E40	Reactive Power	kvar	-0.243
1FBF5EC0	Simple voltage V1	V	240.27
B1BC9A44	Simple Voltage V2	V	13.94
3520759C	Simple voltage V3	V	240.15
0573B7BA	THD I1	%	0.76
0A52B9E4	THD I2	%	0.76
92CDC01C	THD I3	%	0.73
CA1099C7	THD V1	%	2.58
75E62972	THD V2	%	20.44
52CC9F33	THD V3	%	2.56
Composite variables			
Key	**Label**	**Unit**	**Instant values**
EAD2C24C	Device version		2.8
Close			

XIX.   DELETE LOGS
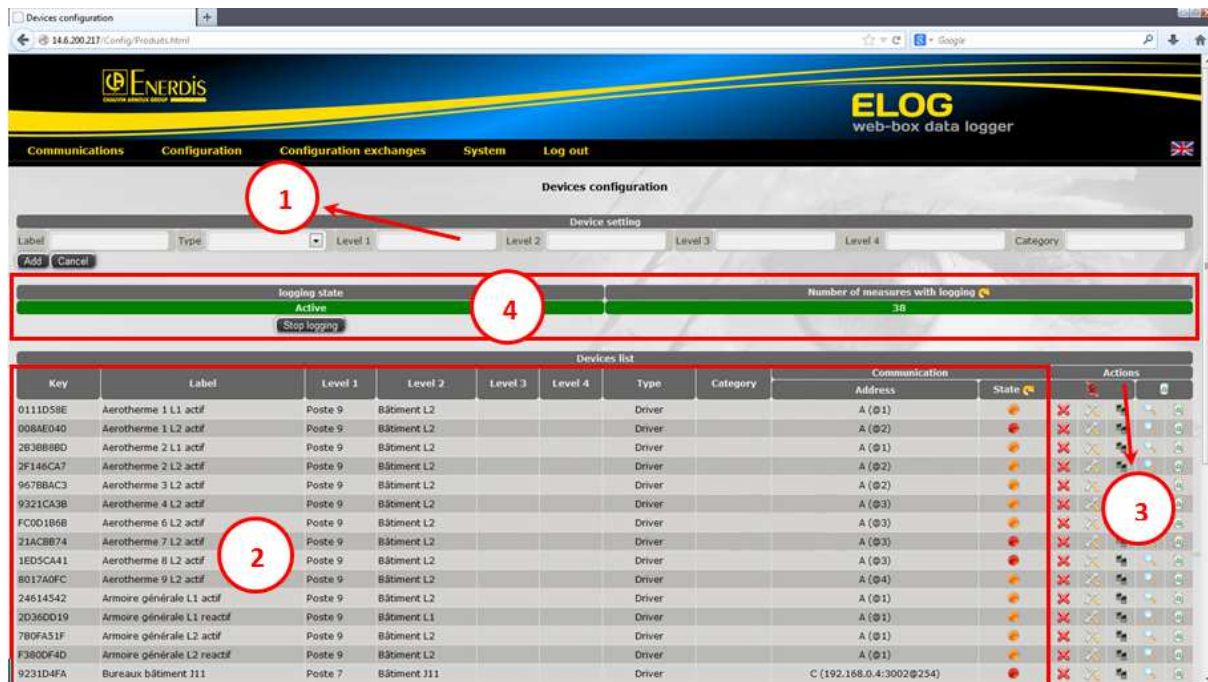
This paragraph explains how to delete the data logged for one or more Devices.

Pre-requisites

- Your ELOG is accessible and you are connected to its embedded web pages.
- A Device ⓘ needs to have been created.

Operating Mode

- Click on "Configuration > Devices".
- The following window is displayed:

- Deleting Indexes ⓘ :
  - <u>For a single Device</u>:

  Deleting the logs of a single Device: in area ③, use the ⬛ command located on the Device line.

  On the last line of the list, the message "Deletion of Device logs OK" confirms that the operation has been successfully completed.

  - <u>For all Devices in the list</u>:

Deleting all logs for all Devices: in area ③, use the 🔳 command located under the "Actions" cell. On the last line of the list, the message "Deletion of all Device logs OK" confirms that the operation has been successfully completed.

XX.   DELETING DEVICES
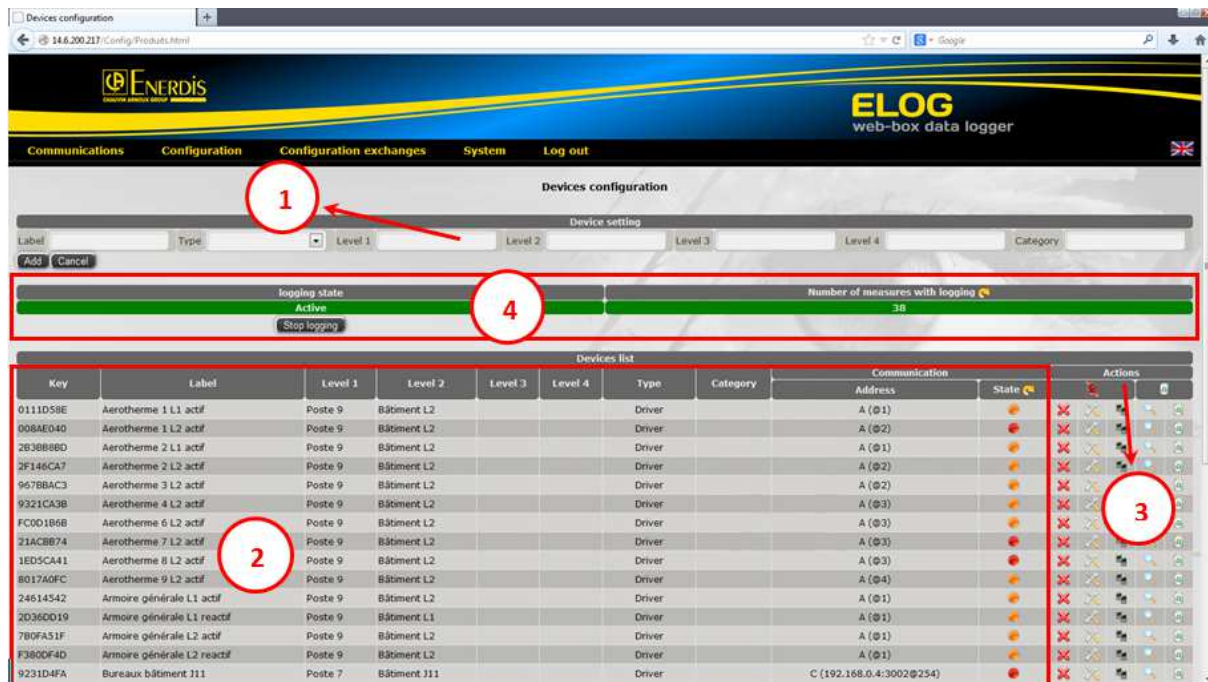
This paragraph explains how to delete one or more Devices.

Pre-requisites

- Your ELOG is accessible and you are connected to its embedded web pages.
- A Device ⓘ needs to have been created.

Operating Mode

- Click on "Configuration > Devices".
- The following window is displayed:

- Deletion of Device(s):
  - <u>Deleting a single Device</u>:

  in area ③, use the ✖ command located on the Device line. A message to confirm or cancel the action is displayed.

  - <u>For all Devices in the list</u>:

  In area ③, use the ✖ command located under the "Actions" cell. A message to confirm or cancel the action is displayed. The message "No Device is defined in ELOG" validates the operation.

XXI.   ELOG FIRMWARE UPDATE

> **This paragraph explains how to import and update ELOG firmware**

Pre-requisites

- Your ELOG is accessible and you are connected to its embedded web pages.
- You know the location of the firmware version to import.

Operating Mode

- Click on "System > Firmware".
- Click on "Choose a file" and select the file to import (xxxx.tar.gz type file) in the tree structure of your computer, then click on "Update". A message confirms that the programme update has been successfully completed.

XXII.   ELOG REBOOT

> **This paragraph how details to reboot remote ELOG**

Pre-requisites

- Your ELOG is accessible and you are connected to its embedded web pages.

Operating Mode

- Click on "System > About".
- Click on "Reboot"

XXIII.   SYSTEM DATA INFORMATION

This paragraph explains how to display the system data information of your ELOG

Pre-requisites

- Your ELOG is accessible and you are connected to its embedded web pages.

Operating Mode

- Click on "System > About".
  The window displayed provides information on the "Release" version and "Build number" of your ELOG.

XXIV.   LEGAL MENTIONS

- Librairie modbus
- Licence MIT pour JSON & mongoose
- Licence ATMEL pour le bootstrap
- Licence GPL pour les drivers et la gestion dans linux d'un disque de 16Go

Librairie Modbus :

```
/*
 * mbus.c - general purpose libmbus functions
 *
 * Copyright (c) 2003, Victor Antonovich (avmlink@vlink.ru)
 *
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 *
 * $Id: mbus.c,v 1.1 2009-05-07 12:33:33 xavier Exp $
 */
```

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 * Michael Clark <michael@metaparadigm.com>

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bootstrap pour l'AT91SAM9260.

/* --

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 * --

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u-boot version 2010.06 . Licence **GPLv2** (voir ci dessous)
#
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Wolfgang Denk, DENX Software Engineering, wd@denx.de.
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#

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along with this program; if not, write to the Free Software
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA  02110-1301,
USA.
```

       Ajout de la board elog. Basé sur la board du kit d'évaluation ATMEL. Utilise les drivers de
l'AT91SAM9260 fournis par ATMEL
              * Copyright (C) 2005 SAN People
              * Copyright (C) 2006 Atmel

       Ajout d'un driver pour la RTC ds1343
       Dérivé d'un driver codé par David Brownell

       Ajout d'un driver pour le PHY Ethernet DP83848
        très fortement inspiré d'un driver   codé par Stuart Menefy <stuart.menefy@st.com>
        maintenu par Giuseppe Cavallaro <peppe.cavallaro@st.com>
        Copyright (c) 2008 STMicroelectronics Limited

       Ajout d'un driver LED Heartbeat Trigger avec les timings de modifiés
        * Copyright (C) 2006 Atsushi Nemoto <anemo@mba.ocn.ne.jp>

```
    *
    * Based on Richard Purdie's ledtrig-timer.c and some arch's
    * CONFIG_HEARTBEAT code.
```

Modification de Buildroot

```
    * Modification pour bénéficier d'un RAMdisk de 16Mo et non 8
```

To Get Source Code, contact Enerdis

export@enerdis.fr / info@enerdis.fr

ENERDIS

16 rue Georges Besse, SILIC 44

92182 ANTONY Cedex

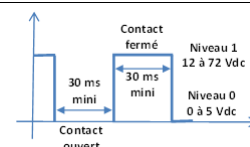Tél.: (33) 1 75 60 10 30

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```

XXV.   CHARACTERISTICS

AUXILIARY POWER SUPPLY	
Alternating current:	80 to 265 Vac - 10 VA - 42.5 to 69 Hz
Direct current:	80 to 375 Vdc - 7W

STATUS LED	
Connection to power supply:	Green light on (equipment connected to power supply and processor activity) Continuous green light for 10 seconds, then 2 quick flashes
Communication:	Flashes green every 500 ms if communications in progress.
Error:	Red flashing light (product error).

COMMUNICATIONS INTERFACES	
RS485 A and RS485 B:	Type: RS485 2 or 3 wires (screening) Protocol: Modbus in RTU mode Operating mode: master mode - half duplex Speed: 2400, 4800, 9600, 19200 and 115 200 bits/sec Parity: no, even or odd Jbus address: 1 to 255 Stop bit: 1 or 2 Standard reference: EIA485
Ethernet:	Type: RJ45 - 8 points Protocol: HTTP in slave mode - Modbus/TCP, Modbus over TCP/IP in master mode Speed: 10-100 baseT Indication: 2 leds (activity on the line and type of network 10 or 100 BaseT) Maximum length: 100 m max

INPUTS	
Number of inputs:	5
Operating mode:	Counting pulse input
Operating mode:	Logic level 1: from 12 to 72 Vdc Logic level 0: from 0 to 5 Vdc Pulse duration: 30 ms min at level 1 then 30 ms min at level 0 Frequency: 0 to 16.67 Hz
Power absorbed:	<500 mW
Type of protection:	Optocoupler
Connection:	No polarity
Channel isolation:	500 Vac for 1 minute.

MEMORY	
Logging frequency:	For index type variables: every 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60 minutes
	For analog type variables: every 5, 6, 10, 12, 15, 20, 30, 60, 120, 180, 240, 300, 360, 600, 720, 900, 1,200, 1,800 or 3,600 seconds
Depth:	3 months (month in progress, m-1, m-2) of data for frequencies of over 1 minute
	3 days (day in progress, d-1, d-2) of data for frequencies under 1 minute
	Saving mode: FIFO (First In First Out)
Storage mode:	Interchangeable memory card
Capacity:	8 GB
Read / write number:	10 000 cycles maximum
Power reserve:	2.5 sec (under 230 Vac)

CLOCK	
Type:	RTC with external quartz
Precision:	±20ppm (±20 sec every 11.5 days)
Synchronization with NTP:	yes
Saving	30 days max without an auxiliary power source

PROCESSOR	
Type:	ARM9
Frequency:	180 MHz

FUNCTIONAL LIMITS	
Max number of configurable drivers:	100
Max number of simple variables per driver:	30
Max number of composite variables per driver:	10
Max number of devices:	100
Max number of variables with logs:	50

MECHANICAL CHARACTERISTICS	
Size:	120.5x120x81 mm (D x W x H)
Weight:	560 gr
Number of terminals:	10
Connection:	screw terminal
Cable diameter:	6 mm² single-strand - 4 mm² multi-strand
Torque:	0.4 Nm maximum permitted torque on the terminal
Sealing:	Possibility of sealing if required

ENVIRONMENTAL CONSTRAINTS	
Climatic constraints:	Nominal operating temperature +10 to 45℃
	Storage temperature -25 to 70℃
	Humidity in compliance with IEC 62052-11 (standard applied to electricity metering applications)
	- <75%., annual average
	- 95%, over 30 days naturally spread out over the course of the year
	- 85%, occasionally other days
	Compliant with IEC 66068-2-1 for cold testing
	Compliant with IEC 66068-2-2 for dry heat testing
	Compliant with IEC 66068-2-30 for damp heat cyclic testing
Safety constraints:	Compliant with IEC 61010-1
	Installation category: III
	Level of pollution: 2
	Fire resistance: Conforms to UL94 for safety level V1
Mechanical constraints:	Protection level conforming to IEC 60529 for the following safety level:
	- IP 51 (on the front panel)
	- IP 20 (on the rear panel)
	Mechanical shock, compliant with IEC 66068-2-27
	Vibrations according to 60068-2-6
	Spring impact hammer resistance according to IEC 60068-2-75
	Freefall in packaging from a height of 1m, in accordance with NF H 0042-1
Electromagnetic constraints:	Compliance with IEC 62052-11 (standard applied to electricity metering applications)
	Compliance with IEC 61000-4-2 with regards to electrostatic discharge
	Compliance with IEC 61000-4-3 with regards to electromagnetic fields
	Compliance with IEC 61000-4-4 with regards to bursts
	Compliance with IEC 61000-4-5 with regards to shockwaves
	Compliance with IEC 61000-4-6 with regards to disturbances caused by radioelectric fields
	Compliance with IEC 61000-4-8 with regards to magnetic fields at network frequency
	Compliance with IEC 61000-4-11 with regards to voltage dips, short interruptions and voltage fluctuations
	Compliance with CISPR22 with regards to conducted and radiated radioelectric interference

XXVI. GLOSSARY

Slave address : _address associated with the IP address of equipment fitted with a ModbusTCP Ethernet output._

Modbus slave address : _address of equipment fitted with a Modbus RS485 digital output._

Delay between 2 requests **:** _minimum time between 2 consecutive requests on the RS485 bus._

Driver : _Set of variable(s) to use in a device connected to the RS485 or Ethernet network (meters, power monitor, hub, sensor, PLC, etc.)_

Index logs : _all data recorded chronologically for an index-type variable._

Analog measurement logs : all _data recorded chronologically for an analog-type variable._

Digital input: _digital input operating in counting mode for the connection and use of the pulse outputs of multi-fluid meters (electricity, water, gas, etc.) or number loggers (units produced, number of people, etc.).._

FIFO: _ELOG memory operating mode (First In First Out)_

Modbus over TCP/IP: _non-proprietary communications protocol used for the exchange of information and data on an Ethernet communications network. Encapsulation of RS485 wired network ModBus frames in Ethernet frames._

Modbus RTU: _non-proprietary communications protocol used for the exchange of information and data on a wired RS485 communications network. Frames are RTU (Remote Terminal Unit) type, with 8-bit data._

Modbus/TCP: _non-proprietary communications protocol used for the exchange of information and data on an Ethernet communications network._

Logging engine: _ELOG feature in charge of querying the equipment connected to the RS485 A, RS485 B, Ethernet and digital input communications networks, and periodic logging of data._

Logging frequency : _frequency at which data from equipment connected to RS485 A and RS485 B ports, the Ethernet port and pulse inputs is chronologically recorded._

Device: *Refers to the object (technical or functional) or location (physical or digital) of one or more measured or calculated variables. It is always associated with a driver or pulse input (e.g.: consumption of building 6, outside temperature, furnace power supply, etc.).*

Timeout: *Maximum time to wait for a response after sending a request through ELOG (3 attempts are made).*

Simple variable: *measurement read in a Modbus map embedded in a meter, power monitor, sensor, automaton, etc., equipped with a Modbus communications output. This variable can be an energy index value, temperature, pressure, number, etc. It is generally binary-coded on bytes (8 bits), words (16 bits), long words (32 bits), etc.*

Composite variable: *variable resulting from an operation (+,-, :,x) between two simple variables to obtain a useable final result which is representative of the measurement.*

Index type variable: *variable which represents the result of an accumulated value over time (e.g.: meter index, units produced, etc.).*

Analog type variable: *variable which represents the result of an instant or average value (e.g.: temperature, pressure, voltage, current, power, etc.).*